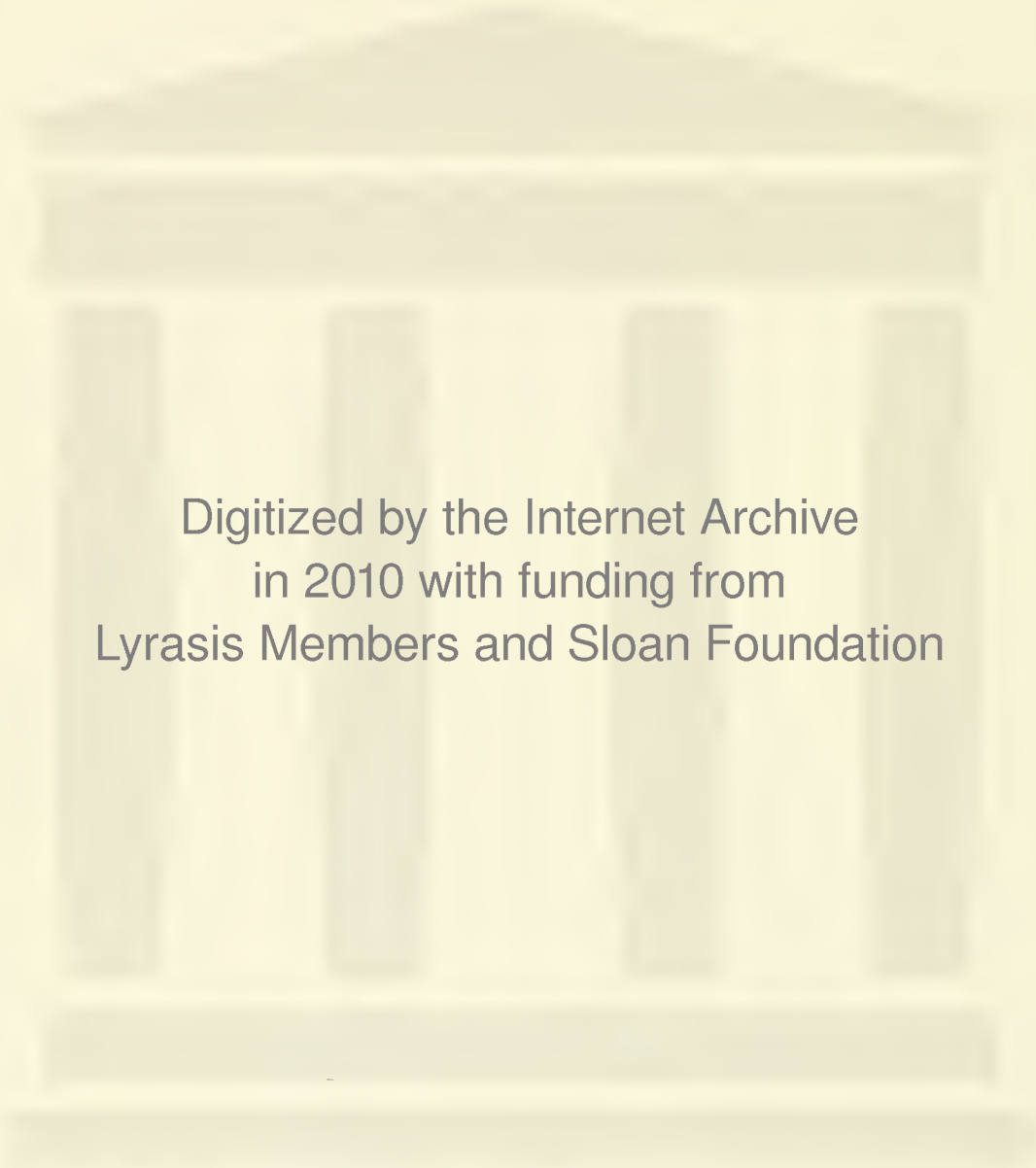

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SUMMARY OF FLOOD RELATED STUDIES IN MARYLAND

REVISED EDITION

JUNE, 1974

Flood Disaster Coordination Office

The preparation of this report was financed in part through a comprehensive planning grant from the Department of Housing and Urban Development, the Economic Development Administration and the Appalachian Regional Commission as part of the President's Disaster Relief Program following Tropical Storm Agnes, June, 1972.

Maryland Department of State Planning
State Office Building
Baltimore, Maryland 21201

Publication No. 210

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June, 1974

ABSTRACT

1. Title: Summary of Flood Related Studies in Maryland

2. Authors: Donald E. Brand, Chief, Flood Disaster Coordination Office
Mary Anne Fleetwood, Staff Planner

3. Subject: Describes activities of Federal and State agencies involved in floodplain and storm water management. It also discusses the impact of the Flood Disaster Protection Act of 1973 on State and local agencies and individuals. Report lists status of all major studies and investigations of flooding problems in Maryland.

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June 24, 1974

The Honorable Marvin Mandel
Governor of the State of Maryland
The State House
Annapolis, Maryland 21404

Dear Governor Mandel:

I am pleased to transmit a second edition of Summary of Flood Related Studies in Maryland. This report describes in more detail the background and activities of Federal and State agencies involved in floodplain management and flood hazard reduction. Additionally, this revised report discusses the Flood Disaster Protection Act of 1973 and its impact on State and local governmental agencies and mortgages of flood prone property.

This report was prepared by the Flood Disaster Coordination Office, established by you in September, 1972 to coordinate Hurricane Agnes recovery planning in the State of Maryland.

Sincerely,

Vladimir Wahbe

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Preface

Summary of Flood Related Studies in Maryland, First published in July 1973, compiled and discussed studies and investigations of flooding problems in Maryland and represented a first effort in coordinating disaster recovery, rehabilitation and prevention planning activities in the State. Its focus was primarily an illumination of what was going on in Federal, State and local agencies concerned with flooding problems.

Prepared to serve three levels of the planning community, Federal, State and local, Summary of Flood Related Studies in Maryland describes the background and activities of Federal and State agencies in sufficient detail to direct the reader to available sources in dealing with specific problems regarding flood prevention planning. At the same time, the report serves as a discovery document which hopefully will enable flood prevention activities to continue in a more coordinated manner.

The second edition of Summary of Flood Related Studies in Maryland, published in the late spring of 1974, updates the information in the first report insofar as it describes new studies and activities of Federal and State agencies concerned with flooding problems since the first report was printed. The second edition discusses the impact of the Federal Disaster Protection Act of 1973 and the new National Flood Insurance Program, records the progress

of studies and planning activities of Federal and State agencies involved with flooding problems.

Acknowledgement is due to the cooperative assistance provided by the Federal and State agencies discussed herein.

I. Introduction

During the period of June 14 to 23, 1972, Hurricane Agnes swept across the eastern coast of the United States from North Carolina to New York State causing severe damage and loss of life. Baltimore City and 22 of 23 Maryland counties were declared Federal disaster areas, thus becoming eligible for Federal emergency disaster assistance.

To implement this assistance, a joint "Statement of Agreement" was executed by Marvin Mandel, Governor of Maryland, and Thomas M. Phelan, Federal Regional Council (FRC) Coordinator for Maryland. The FRC is composed of regional directord of Federal agencies and is responsible for coordinating requests and disbursement of Federal funds. The agreement provided that:

1. The Maryland Department of State Planning would coordinate all of the State and local flood planning efforts. The Flood Disaster Coordination Office (FDCO) was established to carry out this assignment.

2. The Federal Regional Council would establish an office in Baltimore to coordinate the Federal response; and

3. The FRC would, through its individual members, provide planning aid and technical assistance to Maryland in its long-range planning and rehabilitation effort.

Planning assistance of $500,000 was allocated to the State for the long-range planning effort. FDCO's responsibilities include the administration of the funded flood recovery planning and preven-

tion programs within various State and local agencies and other activities as set forth in the following FDCO program objectives:

1. Promote and assist in a process utilizing existing governmental organizations to effectively deal with flood problems.

2. Encourage and develop an efficient system for the collection, evaluation, coordination and dissemination of flood recovery, rehabilitation and prevention information.

3. Encourage and direct Federal policies and programs to optimize their effectiveness in light of Maryland's needs.

4. Redirect and help flood prevention planning efforts at all levels.

This report is an important contribution in satisfying these objectives.

Changing land uses resulting from the demands for housing, employment, shopping and recreational facilities have had far reaching effects on watershed characteristics. These characteristics determine the flow conditions and geometric patterns of rivers and streams. In an effort to minimize the adverse effects of these changing characteristics, numerous approaches have been employed. The techniques can be placed into one of two basic categories: (1) Those that are related to the rivers and streams and are primarily protective in nature; and (2) those that are more concerned with the adjacent floodplains and are more preventive in intent. The former, due to their large scale, have been most noticeable. They include, for example, the construction of reservoirs, dred-

ging and widening of stream channels, and the building of levees. The U.S. Army Corps of Engineers and the Soil Conservation Service have been actively involved in many of these flood protective efforts.

Increasingly, it has been recognized that flood protective measures must be supplemented by flood preventive techniques. This recognition is due in part to the excessive cost often associated with flood control projects and the awareness that such projects are not keeping pace with expanding development and other factors contributing to rising flood damages. As a result, more attention is being focused on the land lying adjacent to the rivers and streams, and the increase in impervious areas due to development throughout the contributing watershed.

The Federal Government has taken steps to encourage communities to adopt and enforce land use controls and other floodplain management practices. For example, the Federal Flood Insurance program requires that local governments applying for coverage adopt measures to guide development so that flood damage is avoided or reduced.

Programs have been instituted in many parts of the State to delineate flood hazard areas along waterways in urbanizing areas, or areas where intensive development is anticipated. Floodplain information and flood control studies are being made by the Corps of Engineers at the request of local governments. The U.S. Geological Survey has recently completed a delineation of flood-prone areas to aid planners and administrators in guiding development away

from these areas. The Soil Conservation Service is conducting flood control studies and cooperating with the State Department of Natural Resources in completing flood hazard and storm drainage studies. The Department of Housing and Urban Development is contracting with Federal agencies to complete flood insurance studies. The above activities and their relationship to flooding problems in Maryland are discussed in this report along with maps showing the approximate locations of the areas under study.

II. Summary of Findings

In the process of compiling flood related studies and investigations, conflicts and conformities of government activities in the area of floodplain management and flood protection planning became evident.

Discussions with the planning departments of most jurisdictions in 1974 revealed that planners and government officials generally are more sensitive to the issue of regulating and controlling development in the floodplains than they have been in the past. Although some counties still do not have adequate ordinances to regulate development out of floodplains, others, in the past year, have adopted more stringent subdivision and zoning ordinances or anticipate stronger floodplain management as a result of the requirements for participation in the National Flood Insurance program. Still other counties have given consideration to floodplain management programs in their comprehensive plans and expect some results in the form of more detailed administrative review and more stringent regulations.

In Montgomery County there has been a progressive approach to floodplain management. This approach focuses on maintaining the stream valley in its natural state and preserving, where possible, the floodplain for parks and recreational purposes. When feasible, Properties within floodplains are acquired as a flood prevention measure. Prince George's County may soon adopt a similar acquisition program. Many other counties are discussing similar floodplain management activities.

A requirement of the Flood Disaster Protection Act of 1973 (discussed in Sec. III, A) that floodplain boundary maps be made for communites identified by FIA as flood prone, has been to trigger a proliferation of preliminary flood hazard boundary studies throughout the State. However, there still exists a need to properly coordinate these studies with local planners, public works engineers, health officials, and the general public.

Flood prone area maps were originally prepared by the U.S. Geological Survey to show administrators, planners and engineers concerned with future land development those areas subject to flooding. Although more detailed information (for formulating zoning regulations, for economic studies, or for setting design criteria) may be required to minimize future flood losses, the information shown on preliminary flood prone area maps can be useful in the preparation of development plans, in zoning matters and review of subdivision plats and building applications as a general guide in the identification of possible areas of floodway encroachment. Also, the Department of State Planning has recently produced maps of natural soil groups which show the location of alluvial soils that can be used as indicators of flood prone areas. These maps were prepared covering the State at a scale of 1"=1 mile. Other information is also available and discussed within this report.

Local officials fear that the preparation and subsequent enforcement of floodplain regulations based on general studies or delineations such as flood prone areas defined by the U.S. Geo-

logical Survey will not survive a court challenge as to their reliability. The State's right to regulate encroachment of the fifty-year floodplain was upheld in a recent Court of Appeals decision, "A.H. Smith Sand and Gravel Company vs. Water Resources Administration" (September Term). The opinion stated that "the State has a legitimate interest in seeing that floodplains are not unduly restricted". Apparently, at the beginning, Smith's operation was not an encroachment, but as the population of the area increased, the boundaries of the 50-year floodplain widened and enveloped areas of the Gravel Company's operation.

The original National Flood Insurance Program authorized in 1968 and administered by the Department of Housing and Urban Development, was created to curb the continually increasing annual losses from flood damage. Although that program was good in concept, it was defective in a very important area. Individuals and communities had not been participating in the restriction of development within floodplains. Their desire to develop floodplains and their ability to obtain disaster relief often outweighed their motivation to purchase flood insurance. The 1973 flood insurance legislation has, in its initial stages, been a partial curative to this defect. Specifically, the Federal Disaster Protection Act of 1973 denies Federal financial assistance or assistance from any federally supervised lending institution for construction or renovation in a designated flood-prone area unless the community and individuals

applying for loans or mortgages are participating in the program. Many local jurisdictions identified as flood-prone under the new act are now participating in the emergency flood insurance program, and hopefully other communities will come into the program as they grow to comprehend its intent, its value and its operations.

Community apathy about participation in the flood insurance program has been discouraging. Although many communities in Maryland are participating in the program, the private sector has been less than responsive in applying for subsidized coverage for buildings in flood-prone areas. The causes for apathy about purchasing Federally subsidized flood insurance arise from a variety of sources: inadequate publicity about the program, infrequency of major floods in the last three years (a factor promoting the erroneous view that flooding is only a remote possibility), and the lifting of a Federal ruling which would have taken away disaster relief payments from eligible communities that ignored the insuring system. Communities and private purchasers indifferent to or slow to apply for flood insurance will soon realize that they will be <u>required</u> to purchase flood insurance for homes, mobile homes, and personal property in flood-prone areas to qualify for loans or mortgages from federally supervised savings and loan institutions.

The Flood Insurance Administration has been slow in preparing preliminary flood hazard boundary maps. These maps are utilized by

local jurisdictions as a basis for preparing more stringent regulations and by lending institutions to see if the mortgagor's property is flood prone. At a later time additional flood insurance studies, which include the detailed delineation of the 100-year floodplain, will be made. These detailed studies are necessary so that actuarial rates can be set prior to jurisdictions qualifying under the regular program. The Corps of Engineers and SCS are well occupied with existing and authorized flood related studies. In addition, the necessary funding for completing detailed flood insurance studies for thousands of local jurisdictions in the nation is astronomical. In all probability, the completion of detailed flood insurance studies for all eligible communities could take years. This condition may very well necessitate extending the December 31, 1975 deadline for entering the emergency flood insurance program. However, the extension of the emergency program may have little impact in Maryland because those communities which have applied and have not received detailed boundary information will continue to be eligible for insurance coverage until six months after they receive detailed information.

Once completed, the detailed flood studies will serve to limit development in flood-prone areas because actuarial rates will rise for construction below certain elevations. In addition, developers building in flood hazard areas will be required to purchase flood insurance to qualify for federally related financing.

It has been pointed out that FIA has been slow in the preparation and distribution of preliminary flood hazard boundary maps to jurisdictions which have received emergency coverage. Also, flood related studies are done by watershed, not by incorporated entities. For this reason FIA, in order to complete the detailed flood insurance studies sooner, should give priority to jurisdictions where flood studies are already completed or near completion. In this way, FIA would be in a better position to contract for actuarial rate studies for entire jurisdictions. This is being done in Prince George's County where the Corps of Engineers is doing a rate study in the last remaining area, the Patuxent River Watershed. The FIA had, by mistake, set actuarial rates before the entire county was completed. This shows the need for stronger role by the State in coordinating these studies.

Most of the watersheds in Maryland which have serious flooding problems have been identified and are in some phase of study by Federal, State or local agencies. Small watersheds have been studied by local agencies in some cases. The lower watersheds of the Big and Little Gunpowder Falls in Baltimore County and the Bynum Run and Winters Run Watersheds in Harford County have experienced significant flooding problems, but no large scale studies have been initiated. Other such areas within the State probably exist.

Almost all activities in the State with regard to flood prevention planning have disregarded coastal and bay zone management

with regard to tidal inundation. A survey of the Chesapeake Bay was made by the Corps of Engineers in 1963. At that time, no further planning or investigations for provisions of hurricane protective work were recommended. This study indicated that the entire shoreline is vulnerable to damage from abnormal tides and wave action from severe storms. In light of the recent completion of the parallel Chesapeake Bay Bridge and increasing development on the Eastern Shore, it is suggested that this survey be re-evaluated.

The lack of coordination and resulting duplication of effort in preparing related studies within the State is evident. There are approximately 16 areas under study which are or have been studied by more than one agency. This has been recognized by the agencies involved and active steps are being taken to avoid duplication in the future. However, it is clear that a more active role must be taken in setting priorities for all flood related studies not only with regard to the specific type of study proposed, but also with regard to the overall needs of the State.

III. Agencies Conducting Studies and Investigations of Flooding Problems in Maryland

A. Federal Insurance Administration, U.S. Department of Housing and Urban Development

Federally subsidized flood insurance is available to eligible communities under the National Flood Insurance Program administered by the Federal Insurance Administration (FIA) of the U.S. Department of Housing and Urban Development. This chapter discusses 1) the 1968 National Flood Act, 2) 1969 legislation which authorizes the "Emergency" flood insurance program, and 3) the new Federal Disaster Protection Act of 1973.

The National Flood Insurance Program was originally established by the National Flood Insurance Act of 1968 to make specified amounts of flood insurance, previously unavailable from private insurers, available under Federal auspices. A community could enter the program by applying for coverage and by agreeing to adopt land use and control measures meeting HUD criteria and intended to reduce or control future flood losses. However, because of delays in preparing detailed rate-making studies, there were only four communities eligible for insurance at the time of Hurricane Camille in August 1969. This prompted the enactment of the Emergency Flood Insurance Program in 1969 which authorized the immediate availability of subsidized flood insurance on an emergency basis for communities that applied for eligibility and agreed to adopt land use measures to reduce future flood losses.

The Flood Disaster Protection Act of 1973 improves and expands the flood insurance program authorized by the 1968 law. First, the new Act at least doubles the limits of insurance coverage while rates are substantially reduced. A homeowner, for example, may purchase $20,000 of flood insurance coverage for as little as $50.00 a year. Also property owners already protected under the original flood insurance program can greatly increase their coverage to protect them against losses from undermining of shorelines and erosion losses caused by abnormal water levels. Third, the new Act extends the emergency program for two more years, thus assuring that individuals and communities can continue to obtain flood insurance that would otherwise be unavailable from private insurers. Fourth, there are new incentives built into the 1973 law urging flood prone communities to participate in the program thereby making insurance available to their citizens. Fifth, flood insurance is required for all federally assisted construction and renovation in flood prone areas. Sixth, there is established a definite appeal procedure for communities or individuals seeking to dispute HUD's determinations regarding flood hazard boundaries and delineations. These summarize the basic highlights of the 1973 Flood Disaster Protection Act.

The implementation and administration of the program authorized by the new Act has, thus far, been unwieldy primarily because many local officials have not received sufficient information in order to understand the value of the program and the pro-

cesses involved in putting it into practice. Therefore, the focus of this discussion is on clarifying three of the major components of the 1973 Act, namely eligibility under the emergency program, the "requirement to purchase" regulation, and eligibility under the regular program.

The Emergency Program - The emergency program provides subsidized flood insurance to communities and individuals before actuarial premium rates based on detailed hydrologic studies have been determined for the jurisdiction. Local jurisdictions identified by FIA as flood prone have until December 31, 1975 to apply for eligibility under the emergency program.

FIA initially identifies all flood prone communities thereby alerting the jurisdiction that it is eligible for participation in the National Flood Insurance Program. After receiving its tentative identification, a jurisdiction may a) promptly apply for participation in the flood insurance program, or b) satisfy the Secretary of HUD within six months that it is no longer flood prone. Figure 1 on the next page of this report shows the communities eligible under the emergency and regular programs for flood insurance coverage in Maryland.

Regardless of whether or not the jurisdiction responds to the notification that it is flood prone, it will receive preliminary flood hazard boundary maps and preliminary rate maps showing areas where flood insurance may be sold at subsidized rates. Appendix

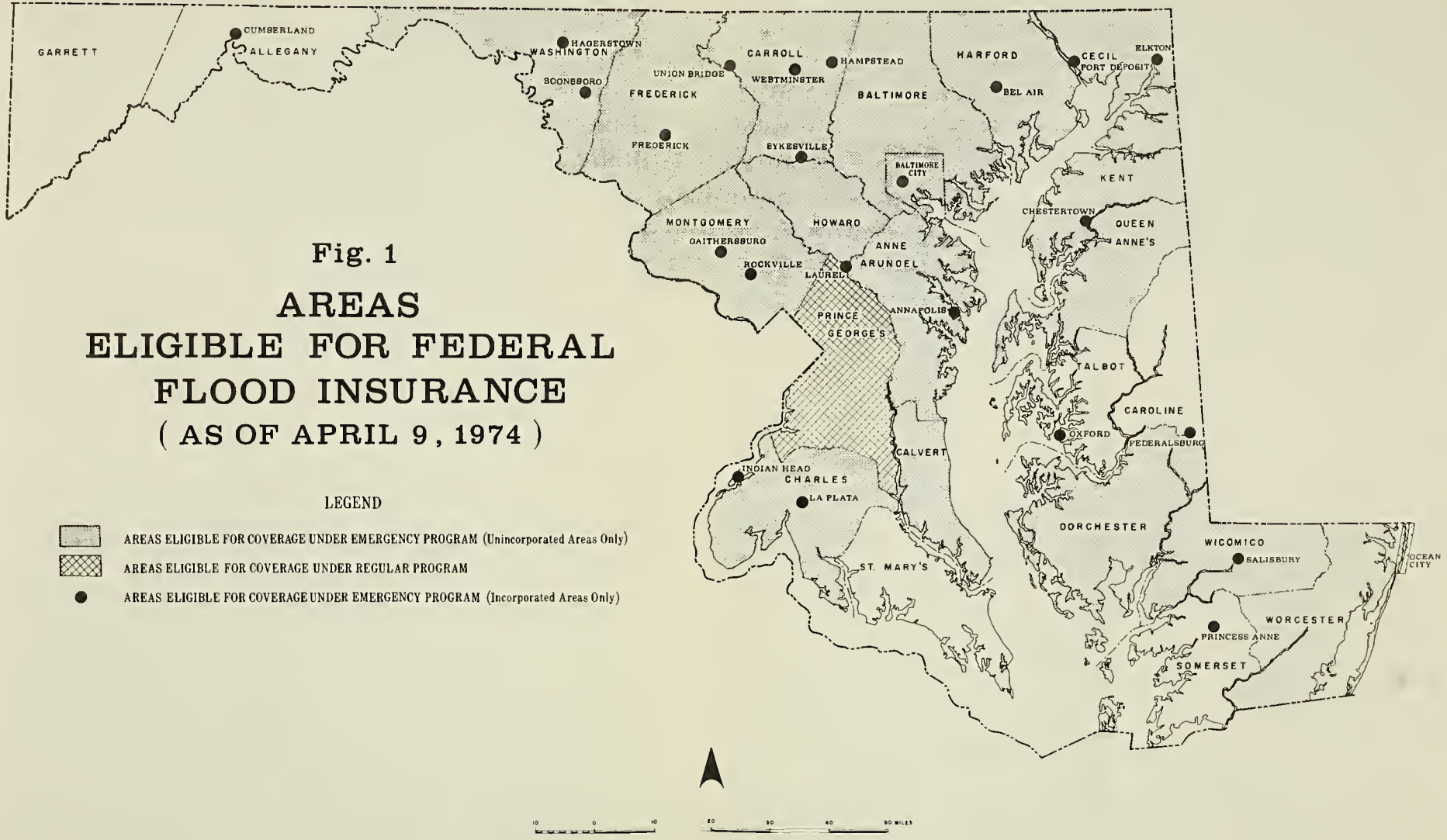

Fig. 1

AREAS ELIGIBLE FOR FEDERAL FLOOD INSURANCE

(AS OF APRIL 9 , 1974)

LEGEND

- AREAS ELIGIBLE FOR COVERAGE UNDER EMERGENCY PROGRAM (Unincorporated Areas Only)
- AREAS ELIGIBLE FOR COVERAGE UNDER REGULAR PROGRAM
- AREAS ELIGIBLE FOR COVERAGE UNDER EMERGENCY PROGRAM (Incorporated Areas Only)

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B of this report sets forth the limits of subsidized coverage and the applicable premium rates.

Once a jurisdiction is tentatively identified as flood prone, makes application through FIA for participation in the program, and has received its preliminary boundary maps, it must then alert the private sector that individuals in flood prone areas may purchase insurance from their local insurance agent at subsidized rates. The private insurance industry is working cooperatively with the Federal Government in providing subsidized flood insurance. To this end, an association of private insurance companies was formed, and this association appoints a state-wide servicing company to disseminate information about the program, to process all insurance policies, and to handle adjustment of claims for loss payments. In Maryland, the service company is the U.S. Fidelity and Guaranty Company.

In order to participate in the National Flood Insurance program, thereby enabling individuals to purchase subsidized insurance, local jurisdictions must submit an application to the Federal Insurance Administration, HUD Building, Washington, D.C. 20410. Prior to applying, the jurisdiction must adopt certain minimum regulatory measures to reduce or avoid flood damage within flood prone areas. Assistance in preparing and submitting an application may be obtained from the Department of Natural Resources.

Between March 2, 1974 and July 1, 1975, flood insurance is generally required by the new Act only when financial assistance,

in the form of a loan, is provided to finance the acquisition, construction, repair or improvement of a building or mobile home located within an identified special flood hazard area in a community participating in the flood insurance program. Under the new requirements, all identified communities must enter the program by July 1, 1975. If the community is not participating in the program by July 1, 1975, the community and individuals will be denied federal assistance in the form of grants, loans and mortgages for construction or renovation of buildings within the flood hazard area unless these structures are covered by flood insurance.

"Requirement to Purchase" - If a property owner fails to buy flood insurance for structures within flood prone areas or if a community fails to meet the July 1, 1975 deadline for participation in the program, federally-related financial assistance for buildings in the floodplain will be curtailed. The requirement to purchase regulation (Sec. 102) states that no Federal agency (i.e. HUD, EPA, FmHA, Small Business Administration, Veterans' Administration, Department of the Interior, Department of Agriculture, Department of Transportation, or HEW) and no Federal Instrumentality (i.e. FDIC, Federal Reserve Board, National Credit Union, Farm Credit Association, Federal Home Loan Banks, Federal National Mortgage Association, Office of the Comptroller of the Currency) will issue grants, loans, or mortgages for construction or renovation of flood prone property unless the structure is covered by flood insurance.

Reduced to its essential components, the requirement to purchase regulation means that: 1) All communities identified as flood prone, unless they show cause that they are no longer flood prone within six months of identification, must be in the program by July 1, 1975; after July 1, 1975, residents and communities will have to secure flood insurance coverage to obtain federally-related money (grants, loans or mortgages) for acquisition or construction purposes within identified flood hazard areas. 2) Residents in jurisdictions participating in the flood program by March 1, 1974 will have to secure flood insurance coverage to qualify for federally related money for construction or acquisition purposes within identified flood hazard areas.

The Regular Flood Insurance Program - A jurisdiction may participate in the "regular" flood insurance program when 1) detailed flood insurance studies have been made in the community to establish actuarial rates for coverage and to determine the levels at which new construction would be reasonably safe from flooding; 2) the local jurisdiction has satisfied FIA that its land use control measures in flood prone areas are compatible with Federal standards as outlined in 1910.3, Sub-chapter B - "National Flood Insurance Program", attached to the application form for participation in the National Flood Insurance Program..

The detailed flood insurance studies under the sponsorship of FIA will entail in-depth hydraulic and hydrologic studies, detailed mapping of the 100-year floodplain, and studies relating

frequency of flooding to property damage to determine actuarial rates, i.e. the greater the hazard, the greater the cost of insurance. On the basis of these studies, there will be a detailed flood insurance rate map prepared and issued showing the areas in which flood insurance may be sold under the regular flood insurance program and the actuarial rate zones applicable to such areas. Detailed flood insurance studies will be made for all jurisdictions participating in the regular program. Once completed, these studies will be forwarded to the local jurisdiction and published in local newspapers.

Each local jurisdiction receiving detailed flood insurance studies by FIA has a reciprocal obligation to enact more stringent floodplain management ordinances compatible with Federal standards. It would be wise for each local jurisdiction, after receiving its preliminary flood hazard boundary maps, to review its floodplain ordinances with special attention to qualification under the regular flood insurance program.

After the flood elevation determinations and results of the detailed study are published twice in a prominent local paper within the given jurisdiction, any owner of real property believing his property rights to be adversely affected by the determinations may appeal the findings.

Section 110 of the new Act outlines the appeal process in which the property owner first appeals the determinations to the local government. The local jurisdiction then consolidates

all appeals and may then forward these to HUD for final review and decision.

Status of Communities Eligible for National Flood Insurance -

As of March 27, 1974, in Maryland there were 39 jurisdictions eligible for emergency coverage in the National Flood Insurance program. Two jurisdictions, Prince George's County and Ocean City, Maryland, are already participating in the regular program. This is graphically represented in Figure 1. At the end of March, 1974, preliminary flood hazard boundary maps had been issued to only six jurisdictions.

Detailed flood insurance studies have been completed for Prince George's County and Ocean City, Maryland. Five detailed studies are now underway in the following jurisdictions: Anne Arundel County, Baltimore City, the unincorporated areas of Howard County, the City of Laurel, and portions of Worcester County. Detailed studies are being prepared by either the U.S. Corps of Engineers, the Soil Conservation Service, or private engineering firms, under contract with FIA.

B. U.S. Army Corps of Engineers

The Corps of Engineers' Floodplain Management Services Program and Flood Control Program make available to Federal, State and local governmental agencies information, guidance and advice on flood hazards which will permit them to proceed with such plan-

ning, engineering studies, construction and other actions as may be necessary for wise use of floodplains.

This program includes floodplain information reports, technical services and guidance, guides, pamphlets, related research and comprehensive flood damage prevention planning.

Floodplain information reports are prepared upon the request of State and local agencies to delineate flood problems. Ten of these studies have been completed in the State, two are underway, and twenty are planned. Many of these studies are in the urban or urbanizing areas of metropolitan Washington, D.C. Of the completed studies, six were in Prince George's County, two in Montgomery County, one in Frederick County, and one in the City of Baltimore. There are studies underway in Washington and Frederick Counties. The planned studies are for Washington, Frederick, Prince George's, Montgomery and Howard Counties. The completed and underway studies are shown in Figure 2, on the next page. These are also identified in Section IV, Status of Studies and Investigations of Flooding Problems in Maryland. Letters of application for floodplain information studies are shown in Appendix C.

The reports do not include plans for the solutions of flood problems. They are intended to provide a basis for further study and planning on the part of the local government in arriving at solutions to minimize vulnerability to flood waters. This involves state and/or local planning programs to guide development by con-

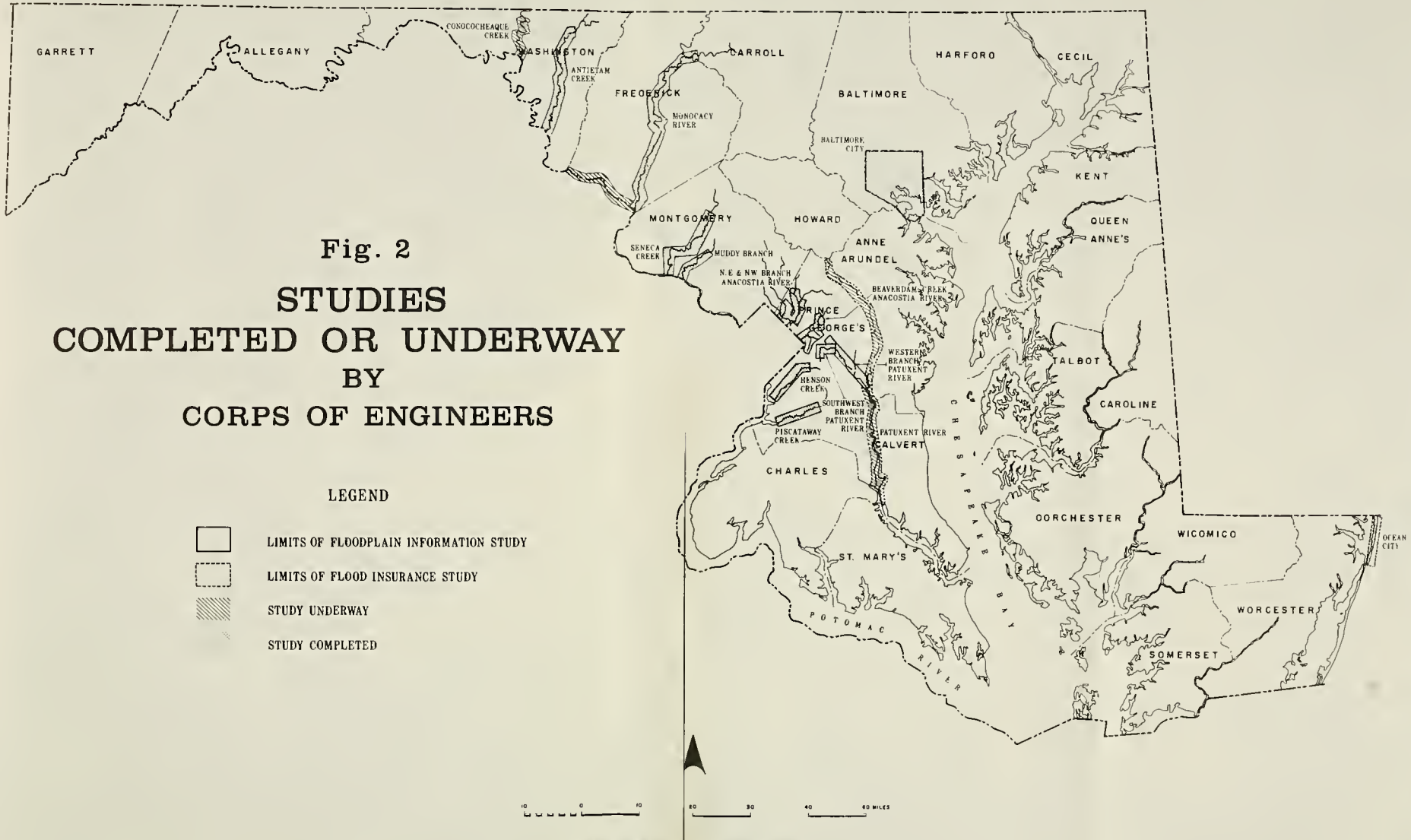

Fig. 2

STUDIES COMPLETED OR UNDERWAY BY CORPS OF ENGINEERS

LEGEND

- LIMITS OF FLOODPLAIN INFORMATION STUDY
- LIMITS OF FLOOD INSURANCE STUDY
- STUDY UNDERWAY
- STUDY COMPLETED

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trolling the use made of the floodplains through regulatory measures such as zoning and building regulations, the construction of flood protection works, or a combination of these two approaches.

It is the responsibility of the State and local government agencies to publicize the information resulting from these studies so that planning groups, zoning boards, private citizens, engineering and planning firms, real estate and industrial developers, and others can act with awareness. Federal agencies also use the flood information in their respective considerations and decisions.

The floodplain information studies completed by the Corps of Engineers cover two significant phases of floods. They first discuss the largest known floods of the past. Secondly, they consider probable future floods; namely, intermediate regional floods and the standard project floods. Intermediate regional floods are floods that have an average frequency of recurrence in the order of once in a 100-year period and are determined from an analysis of known floods on the watercourse under study and other streams which have similar physical characteristics and are in the same general geographical regions. Standard project floods are floods of rare occurrence and on most streams, are larger than any floods that have occurred in the past. However, they should be considered in regulating the use of areas adjacent to the floodway.

The reports contain maps, profiles and selected cross sections which indicate the extent of flooding which might occur

in the future. From the maps, profiles and cross sections, the depth of probable flooding may be learned either by recurrence of the largest known flood or by occurrence of the intermediate regional or standard project floods at any location. With this information, building elevations may be planned high enough to avoid flood damages. If at lower elevations, they can be planned with recognition of the chance and hazard of flooding. Although studies are not requested by the Federal Insurance Administrator, the resulting information has been used as a basis for actuarial studies. To date floodplain information studies have been limited to specific watersheds and have not been done on a jurisdictional basis as required by the Federal Insurance Administration.

The Flood Control Program - This program began in response to the 1936 Flood Control Act authorizing the Corps of Engineers to become actively involved in coordination with State and local entities and in studying and formulating sound solutions to flood problems throughout the Nation. The Flood Control Program of the Corps of Engineers primarily benefits urban areas where most flood damage occurs.

Local citizens who desire improvements for flood control have two alternatives in requesting the Corps' assistance. The primary means is by contacting their Congressman who in turn can take the action necessary to authorize and fund a Federal study. For small, localized flood problems where the cost of the antici-

pated solution is $1,000,000 or less, the Corps has ongoing authority to undertake a reconnaissance study.

During their flood control studies, the Corps evaluates the economic, engineering, environmental, and social feasibility of a wide range of alternatives. The various solutions considered during a normal study include dams and reservoirs, levees, walls, channel alterations, drainage facilities, flood forecasting and warning, floodplain evaluation, emergency flood fighting and flood proofing. If the study demonstrates the feasibility of a project or program, authorization and funding can then be sought and if they are obtained, the project or program can be accomplished.

Past flood control studies in Maryland have resulted in local flood protection projects at Cumberland in Allegany County, Kitzmiller in Garrett County, Upper Marlboro, Forest Heights, and along the Anacostia River in Prince George's County and a dam and reservoir flood control project near Bloomington in Allegany County. Current studies underway in Maryland are the Patuxent River Basin Study and the Nanticoke River and Tributaries Study (Federalsburg). Flood control studies that are authorized but have not been initiated include Beaverdam Creek and Cabin Branch in Prince George's County, and watersheds in the Baltimore Metropolitan area.

Public Law 71, Eighty-fourth Congress, requested studies throughout the Nation to determine the feasibility of providing

improvements for preventing loss of human lives and damage to property resulting from flood and wave action caused by hurricanes. In response to this, an interim hurricane survey was made by the Corps of Engineers in Maryland.

The study area included the eastern shore of the Chesapeake Bay from the head of the Bay in Maryland to Onancock Creek, Virginia; and the western shore from the head of the Bay to the mouth of the Patuxent River, excluding the Patapsco River Estuary. The study also included all lands along the shorelines and tributaries that are susceptible to flooding by hurricane-induced high tides. The study indicated that the entire shoreline is vulnerable to damages from abnormal tides and wave action from severe storms. Although the hazards to life and property would be substantial, the District and Division Engineers recommended no further planning or investigations for provisions of hurricane protective work at that time (September, 1963). A similar report was prepared for the Baltimore Metropolitan Area with recommendations that improvements for hurricanes tidal protection also not be undertaken.

C. Geological Survey, U.S. Department of the Interior

The 89th Congress (1966) in House Document 465 recommended preparation of flood-prone area maps to assist in minimizing flood losses by quickly identifying areas of potential flood hazards. The intent of Congress was to quickly obtain a nationwide "recon-

naissance level" of information. A basic premise of the recommendation was that a hydrologist could quickly identify potential flood areas from his assessment of readily available data and from skills obtained through experience.

The Geological Survey (U.S.G.S.) was selected to prepare these maps. Although the greatest confidence cannot be placed in the exact position of the flood boundaries, the maps serve as general warnings of potential flood hazards and as a basis for setting priorities of future detailed studies. Prior to 1969 the maps showed "approximate areas occasionally flooded". In 1969 the project was changed to delineate the approximate boundaries of the 100-year flood. This change was undertaken at the request of the Federal Insurance Administration which was charged with identification of the Nation's floodplains in the August 1968 Flood Insurance legislation. As discussed earlier, the FIA has directed that the floodplain inundated by a 100 year flood be used by local governments in developing floodplain management regulations.

House Document 465 also recommended a three-stage program to delineate major flood hazards: (a) listing of communities (population over 2500) with flood problems; (b) outlining the floodplain on maps or aerial photographs; and (c) accelerating the present program of flood-hazard information reports. The U.S.G.S. was assigned primary responsibility for item (b). The U.S. Army Corps of Engineers completed item (a) in 1967 and is accelerating its program relative to item (c).

The objective of item (b) was to quickly identify areas subject to flooding, without regard to detailed accuracy that will be provided at a much later date under item (c). Areas inundated by a 100-year flood have been outlined on topographic maps.

The scope of the project includes all areas of the United States where flooding from streams, lakes, and tides is a problem. Priority is given to areas listed by the Corps of Engineers under item (a) and to those communities that are interested in participating in the Federal Flood Insurance Program. Those flood-prone areas mapped in the State of Maryland are shown in Figure 3 on the next page.

The Water Resources Division district offices of the U.S.G.S. were encouraged to outline areas subject to flooding in both coastal and tidal areas of the State. Initially, the mapping of flood prone areas subject to tidal flooding was left to the National Ocean Survey and National Oceanic and Atmospheric Administration. Recently, however, the U.S.G.S. has enlarged the scope of its original project to include certain areas of the State subject to tidal inundation. As of January 1974, there was still a substantial portion of the Eastern Shore and all of Southern Maryland where mapping had not been undertaken. According to the Water Resources Division of U.S.G.S., there are no proposals to map these areas in the fiscal year 1974. It is possible that mapping of flood prone areas could be undertaken in the tidal regions of the Eastern Shore and in Southern Maryland during 1975.

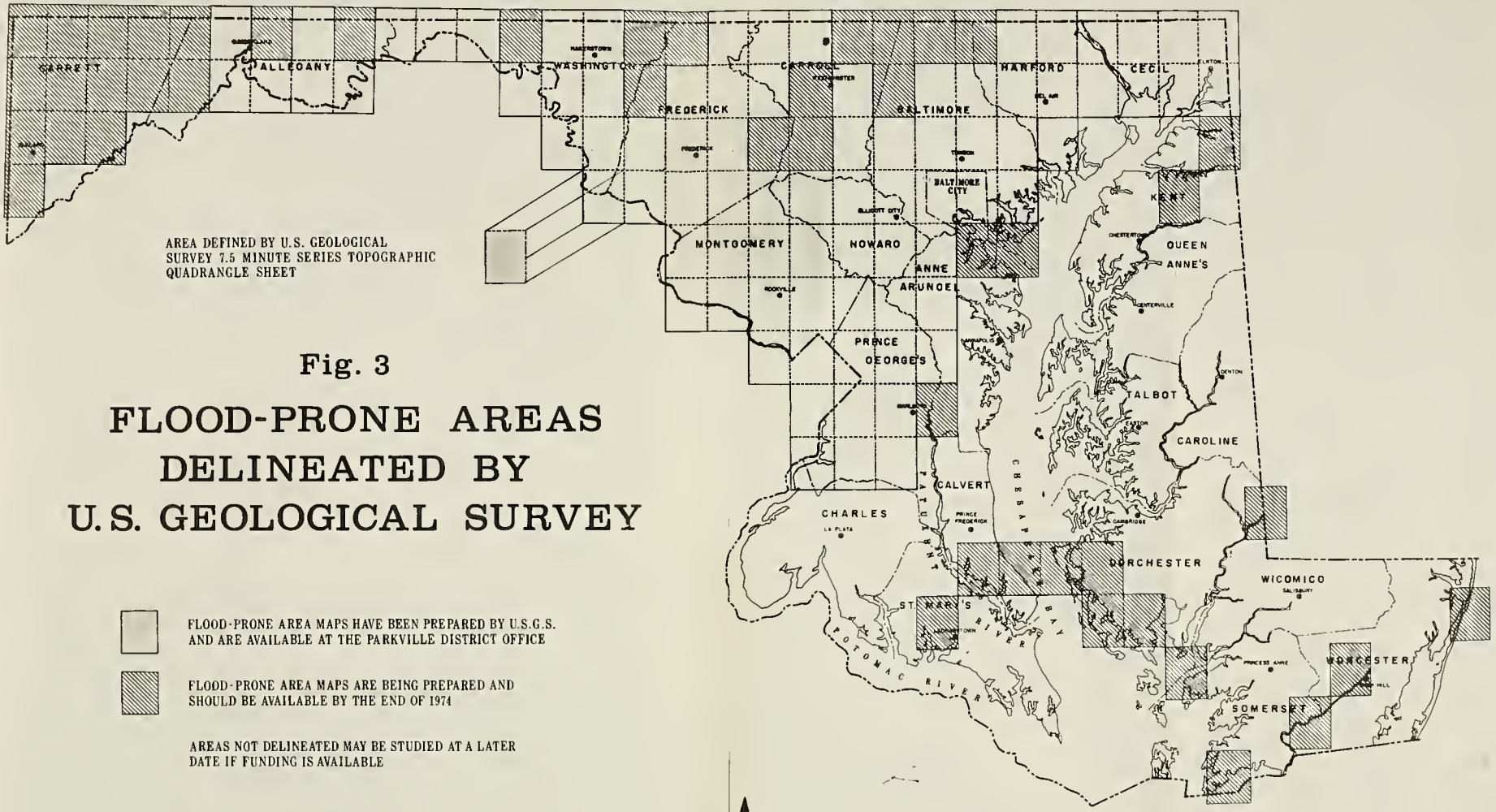

Fig. 3

FLOOD-PRONE AREAS DELINEATED BY U.S. GEOLOGICAL SURVEY

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Preparation for mapping required the U.S.G.S. to assemble all ongoing and completed detailed flood studies to determine the availability of data that could be useful in mapping. The Corps of Engineers' floodplain information studies were used where available.

Discharge-frequency relationships have been defined for Maryland rivers and streams where there are gaging stations. These were used as follows: the difference between the stage of a 100-year flood and the stage of median (50% duration) discharge was determined for all natural-flow gaging stations having flood records of adequate length to define a flood-frequency curve. The regional depth-frequency curve was then defined by plotting these 100-year flood heights against an estimated variable, preferably drainage area, or perhaps mean annual flood discharge. To develop adequate accuracy, it was necessary to define separate relationships for local areas, geologic provinces, or other areal groupings.

To delineate flood prone areas by this method, it was necessary to assume that the contours on a topographic map were exact and intersected streams at about the stage of median flow. A median flow profile was then determined and drawn from measurements on the map. For selected sites along this profile, the 100-year flood depth was determined from the regional depth-frequency curve and a flood profile was drawn. Elevations along the 100-year

flood profile were then utilized to define the flood boundaries by interpolation on the topographic map.

Profiles of past floods were adjusted to approximate the 100-year profile by adding or subtracting an increment of elevation based on the difference in stage between the past flood and the 100-year flood at a gaging station. For the accuracy requirements of this project it was usually satisfactory to assume that the recurrence interval of the observed flood was a constant for a considerable length of river reach.

Elevations and locations of high-water marks of past floods provided information for defining flood profiles. Where topographic maps were available, the profile was also transformed into flood boundaries by interpolation between contours. Distance along the stream channel, necessary for defining the profile, was measured upstream from the mouth.

In some instances, profiles were constructed from data extracted from aerial photographs of floods. After adjusting the data to the approximate 100-year flood, the profiles were used to delineate flood boundaries.

D. Soil Conservation Service, U.S. Department of Agriculture

The U.S. Department of Agriculture (USDA) is authorized through the Soil Conservation Act of 1935 (PL-46), the Watershed Protection and Flood Prevention Act of 1954 (PL-566), and the

Food and Agriculture Act of 1962 and other authorities to provide technical and financial help to individual and local groups in conserving and developing their natural resources. The USDA also helps those groups planning watershed and resource conservation and development projects seek funds and services from other Federal, state and local sources. The Soil Conservation Service (SCS) has leadership for USDA in the programs of soil and water conservation. One of the principal aims of such programs is to assist plan formulation in carrying out conservation measures for erosion and sediment control, watershed protection and flood prevention.

SCS assistance is mainly through Soil Conservation Districts organized under the 1937 Maryland Soil Conservation Districts Law (Article 166). There are 24 Soil Conservation Districts (SCD's) in Maryland, one for each Maryland County plus the Catoctin District in Western Frederick County. Some conservation projects are of such scope, involving so many communities, and often cutting across District boundaries so that special Watershed Associations or Drainage Districts have also been created.

The technical assistance, planning and guidance and other help to SCD's is provided by a variety of Federal, State, County and local governmental agencies and organizations. Some of these are the Soil Conservation Service, the Agriculture Stabilization and Conservation Service of the United States Department of Agriculture, Forest Service and Economic Research Service, Corps of Engineers,

Extension Service and Agriculture Experimental Station of the University of Maryland, the Maryland Department of Natural Resources, and county governing bodies. State and county school systems, farm organizations, service clubs, garden clubs, and many other private organizations help with the total job of conservation education and the application of conservation on the land.

A State Soil Conservation Committee was established by the Maryland General Assembly in 1937 within the State Board of Agriculture and the Regents of the University of Maryland to coordinate the work of SCD's and to secure cooperation and assistance from federal and state agencies to assist SCD's. The law establishing the committee was amended in the 1971 Session of the Maryland General Assembly to include as follows: "The Secretary of the Department of Natural Resources or his designated representative, the principle administrative officer for Agriculture Affairs at the University of Maryland or other University official he may designate, the Chairman of the Maryland Agriculture Commission or other member he may designate, the President of the Maryland Association of Soil Conservation Districts, and three soil conservation district supervisors representing different geographic areas of the State of Maryland ..." A 1972 Act in Maryland recently shifted the State Soil Conservation Committee to the new Maryland Department of Agriculture created by this Act. This Committee is charged by law with the creation of Soil Conservation Districts, coordina-

tion of their activities, providing assistance, and informing the general public about their programs.

The State Committee offers all possible and practical assistance to the SCD's in carrying out their local land use and conservation programs. It also assists SCD's in securing the advice and help of State and Federal agencies having resources that can be brought to bear on soil and water problems and on related land-use programs and problems. These areas include watershed protection and flood prevention, siltation of streams and reservoirs, shore erosion control, highway erosion control, forest and woodland conservation and development, the protection and development of wildlife and the development of public open space.

When requested to do so by the District governing board or by the Maryland Department of Agriculture, the Committee also acts to coordinate the activities of Soil Conservation Districts with the programs of local, state and federal groups concerned with Maryland's land and water problems and resource development. The State Committee supervises the expenditure of State funds appropriated for use in the Soil Conservation District program.

Through SCD's and in cooperation with the State Conservation Committee, the SCS helps carry out watershed-protection and flood-prevention projects and river basin investigations in cooperation with other agencies as authorized by the Flood Control Act of 1944, PL 534 and PL 566 enacted in 1954. Also through conservation

districts, the SCS is helping more and more municipal and county officials planning bodies, and developers cope with problems of erosion, improper land use, flooding and sedimentation. SCS advises and gives guidelines for controlling erosion on highways, subdivisions, shopping centers, and airports. The Service has surveyed and mapped all the soils of the State as part of the National Cooperative Soil Survey Program which they administer. Below is a chart showing status of soil surveys in Maryland as of April, 1974.

Published Soil Surveys	Surveys Completed and Estimated Publication 1/		Mapping Completed and Manuscripts Being Prepared and Estimated Publication		Incomplete Surveys and Estimated Publication
Anne Arundel	Allegany	1976	St. Mary's	1976	None
Calvert	Baltimore 2/	1975			
Caroline	Charles				
Carroll	Garrett				
Cecil	Harford 2/				
Dorchester 4/					
Frederick					
Howard					
Kent 3/					
Montgomery					
Pr. George's					
Queen Anne's					
Somerset					
Talbot					
Washington					
Wicomico					
Worcester					

1/ Fiscal years in which each survey is scheduled to go to the printer. The published survey is available for distribution approximately one year after it goes to the printer. Interim materials preliminary to publication may be viewed in the office of the Soil Conservation Service in the individual counties. However, SCS is not equipped to prepare copies of interim materials for general distribution. Contact the Dis-

trict Conservationist in the county of interest for specific information as needed.

2/ Interim or preliminary reports have been prepared for these counties. Contact the District Conservationist for the Soil Conservation Service in each of these counties for specific information regarding these reports.

3/ Although Kent County is listed as a published soil survey, copies are no longer available for wide distribution. Kent County was published in 1945 as a Physical Land Conditions Report and the text is almost wholly agriculturally related. However, the soil map is detailed and considered to be very useful for making a wide variety of farm and non-farm soil interpretations when used in conjunction with recently prepared interpretative information available at the Kent County Office of the Soil Conservation Service.

4/ Soil Survey is out of print for Dorchester County and additional copies are not available.

The resulting maps provide information on drainage conditions, depth, slope, erosion, parent material and other properties of the soil. Knowing the location of alluvial (stream laid) deposits can help planners avoid such mistakes as placing homes in floodplains.

The locations of studies and investigations by the Soil Conservation Service excluding soil surveys, are shown in Figure 4 on the next page.

Under the Small Watershed Protection and Flood Prevention Act of 1954 (PL 566), the Federal Government, Soil Conservation Districts, local government units, and other sponsors plan and develop watershed improvements in two broad categories: land treatment and structural work. The land treatment work is carried out on the basis of conservation plans developed by landowners with

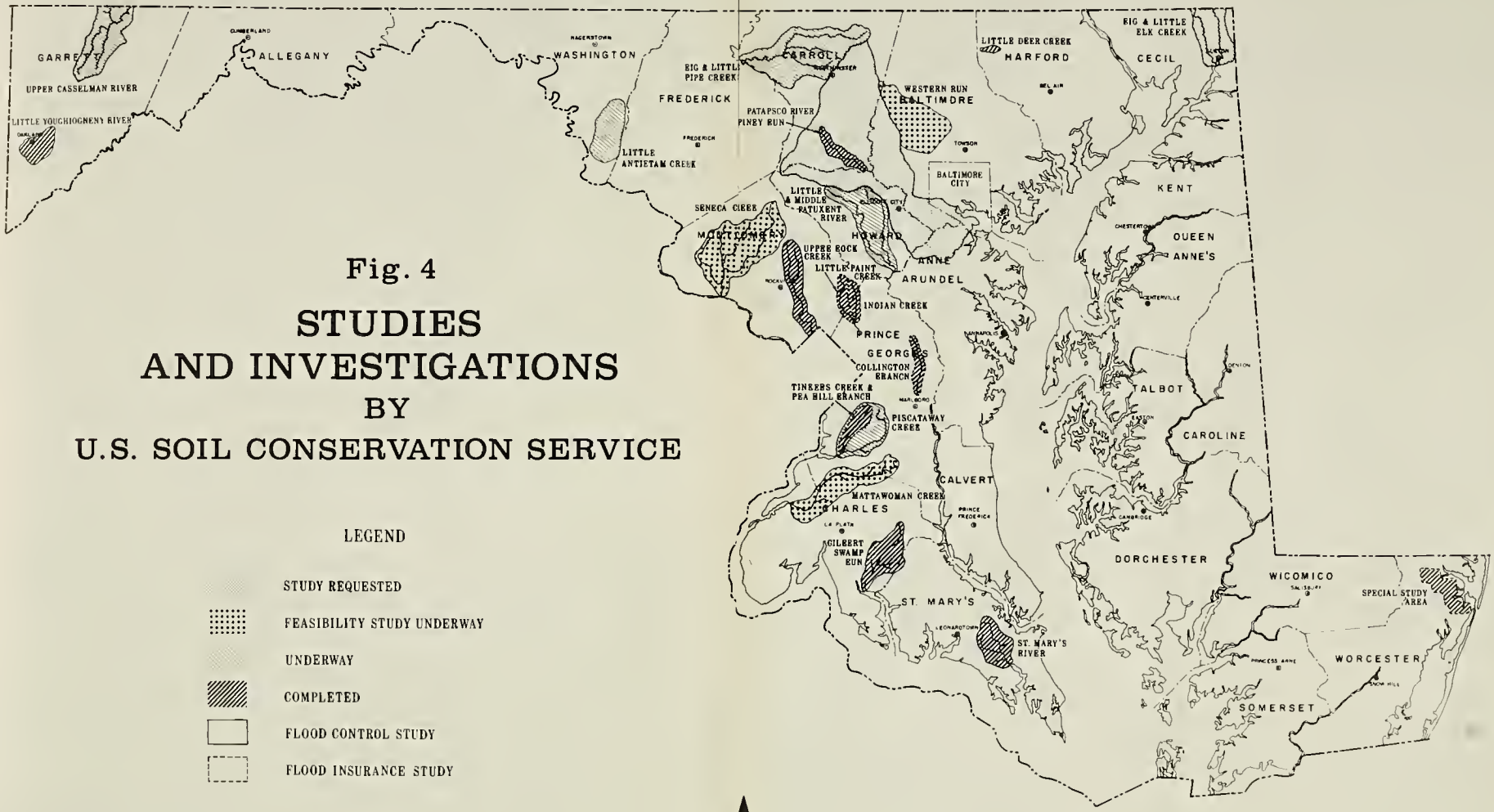

Fig. 4

STUDIES AND INVESTIGATIONS BY U.S. SOIL CONSERVATION SERVICE

LEGEND

- STUDY REQUESTED
- FEASIBILITY STUDY UNDERWAY
- UNDERWAY
- COMPLETED
- FLOOD CONTROL STUDY
- FLOOD INSURANCE STUDY

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technical assistance of SCS. This improved land treatment prevents erosion, decreases runoff and improves the value of the area. Structural work, a result of flood control studies under the PL 566 Program involves the construction of dams and retention reservoirs, agricultural water management measures, municipal and industrial water supply, public recreation developments, and fish and wildlife developments. A Small Watershed, as defined in the Watershed Protection and Flood Prevention Act of 1954, is an area of less than 250,000 acres, or about 390 square miles.

All structures must provide either drainage, irrigation or flood prevention benefits greater than their cost. The State Soil Conservation Committee must study and approve all applications for projects under PL 566. A minimum of one-half of the land above floodwater retarding structures must be under land treatment through an agreement with the Soil Conservation District before Federal funds for construction can be provided. Since 1954, the State Soil Conservation Committee has approved 41 project applications from the Soil Conservation Districts and other local sponsors, covering over 1 million acres of land. Nineteen of the state's 24 Soil Conservation Districts have been involved as co-sponsors of these applications. Of the 41 project applications, 19 included the building of dams, and 22 were for construction of flood prevention and drainage ditches. One of the 19 dam projects includes a small fishing lake. Two planned dams have been completed on the

upper Rock Creek Watershed in Montgomery Soil Conservation District and many of the individual dams within other projects are finished. In the Little Youghiogheny River Project in the Garrett Soil Conservation District, a total of six planned dams have been completed. In the Little Deer Project in the Harford Soil Conservation District, three of four control dams are complete. Also, all of the three planned dams for the Gilbert Run Project in the Charles Soil Conservation District are complete.

The Soil Conservation Service has made flood insurance studies for the Department of Housing and Urban Development. These studies are listed in Section IV, Status of Studies and Investigations of Flooding Problems in Maryland. Only two counties have been studied and only in selected areas. These are Prince George's and Worcester Counties.

E. Maryland State Department of Natural Resources

Two agencies under the Department of Natural Resources (DNR) are involved in flood related studies. They are the Maryland Geological Survey and the Water Resources Administration.

The Maryland Geological Survey is charged with conducting topographic, hydrographic, and geophysical surveys. The Survey's collection, collation, and analysis of geological data is aimed at its application to land use. A program is maintained with the U.S. Geological Survey in the area of water resources investigation and data gathering. Most of the technical work is carried out under

the supervision of and largely with the personnel of the U.S. Geological Survey. This cooperative program is responsible for the gathering and analyzing of flow records of Maryland streams. Most of these studies are not directly related to floodplain mapping, but the data developed is vital for computing flood frequencies. The Survey is involved with geologic mapping which includes alluvial (stream laid) deposits. Alluvial deposits provide a measure of flood prone areas and essentially include the maximum geologic or geomorphic floodplain.

The Maryland Geologic Survey has the following studies in preparation: Cecil County, a geologic map; Baltimore County, a geologic map and environmental atlas; Anne Arundel County, a geologic map and environmental atlas; Towson, a geologic map and environmental atlas. There has also been a geologic map and environmental atlas prepared for Montgomery County by the U.S.G.S.

Completed and available for inspection at the Maryland Geologic Survey Office are geologic quad maps of the following areas: White Marsh, Cockeysville, and Reisterstown in Baltimore County; and Union Bridge in Carroll County.

Other geologic quad maps in preparation by the Maryland Geologic Survey are: Catoctin Furnace and Blue Ridge Summit in Frederick County. These maps will soon be available for inspection at the Maryland Geological Survey Office in Baltimore. The following flood related studies are available from this agency:

(1) Flow Characteristics of Maryland Streams by Patrick M. Walker (on sale for $2.50); and (2) "Response and Recovery of a Piedmont Watershed to Hurricane Agnes" by John E. Costa, published in Water Resources Research, a publication of the American Geophysical Union. The latter study treats the response of Western Run to Hurricane Agnes.

The Water Resources Administration is responsible for water resource management activities. This includes water quality and watershed control enforcement, permits, certification and technical services. A permit program for regulating obstructions within the 50-year floodplain and sediment control programs and plans are part of the prevention oriented activities of watershed control. Surface water management by the administration includes surface water appropriation, permit system for dams and reservoirs, permits for waterway obstructions, and review and advisory services.

The Natural Resources Article, Section 8-803, Annotated Code of Maryland (1974 Vol.)* states that "A person is required to obtain a permit ... to construct, reconstruct or make, construct, or permit to be made or constructed, any change or addition to any reservoir, dam or waterway obstruction, or make, or permit to be made, any change in, addition to, or repair of, any existing waterway obstruction, or in any manner to change in whole or in part the

*Recodification of Natural Resources Law previously found in Article 96A, Section 12 enacted by Chapter 4, Acts 1973, First Extraordinary Session.

course, current, or cross section of any stream or body of water, within the State except tidal waters."

Section 8-901 provides that the Department of Natural Resources be responsible for and cooperate with the Federal and local governments in developing and carrying out long-range program for controlling waters in the State and, in addition, to serve in a liaison capacity to government agencies in all matters pertaining to flood control. The Section also provides that DNR shall provide assistance to local governments and other State agencies in interpreting flood information and in drafting local land use and other regulations pertaining to areas subject to flooding. The law also requires that DNR review plans for local public works and exercise regulatory control over appropriation of State waters, construction of waterway obstructions and associated permits.

The present program of the Water Resources Administration involves the following: keeping track of the various studies conducted by other agencies which may provide raw data for further study; conducting floodplain studies usually requested by local jurisdictions and agencies for utilization in land use planning; transmitting and assigning priorities for Corps of Engineers' floodplain information studies and Soil Conservation studies; conducting studies in cooperation with other State and local agencies, such as the Soil Conservation Service and the Maryland National Capital Park and Planning Commission; acting as State Coordinator

for the National Flood Insurance Program; and other duties already discussed concerning Sections 8-901 of the Natural Resources Article of the Annotated Code of Maryland.

A primary goal of the Water Resources Administration is to develop the capability to model the distribution and circulation of water in developing watersheds and thereby better manage natural and manmade activities. One of the initial steps in achieving this goal was the establishment of a cooperative agreement between DNR and SCS to accelerate the generation of floodplain information. Joint studies resulting from the cooperative program are described as flood hazard studies. The steps taken in these studies are as follows:

1. Study area priorities are established by DNR.
2. SCS contracts for low level aerial photography of study area.
3. SCS selects vertical and horizontal control within the study area.
4. DNR conducts field surveys to establish control.
5. SCS Cartographic Division develops stream cross-section data and topographic detail using stereo-plotters.
6. SCS hydrologists establish runoff characteristics such as time of concentration, watershed geometry and rainfall intensity.
7. DNR establishes the roughness coefficients.
8. DNR locates and measures bridge openings, culvert dimensions, etc.

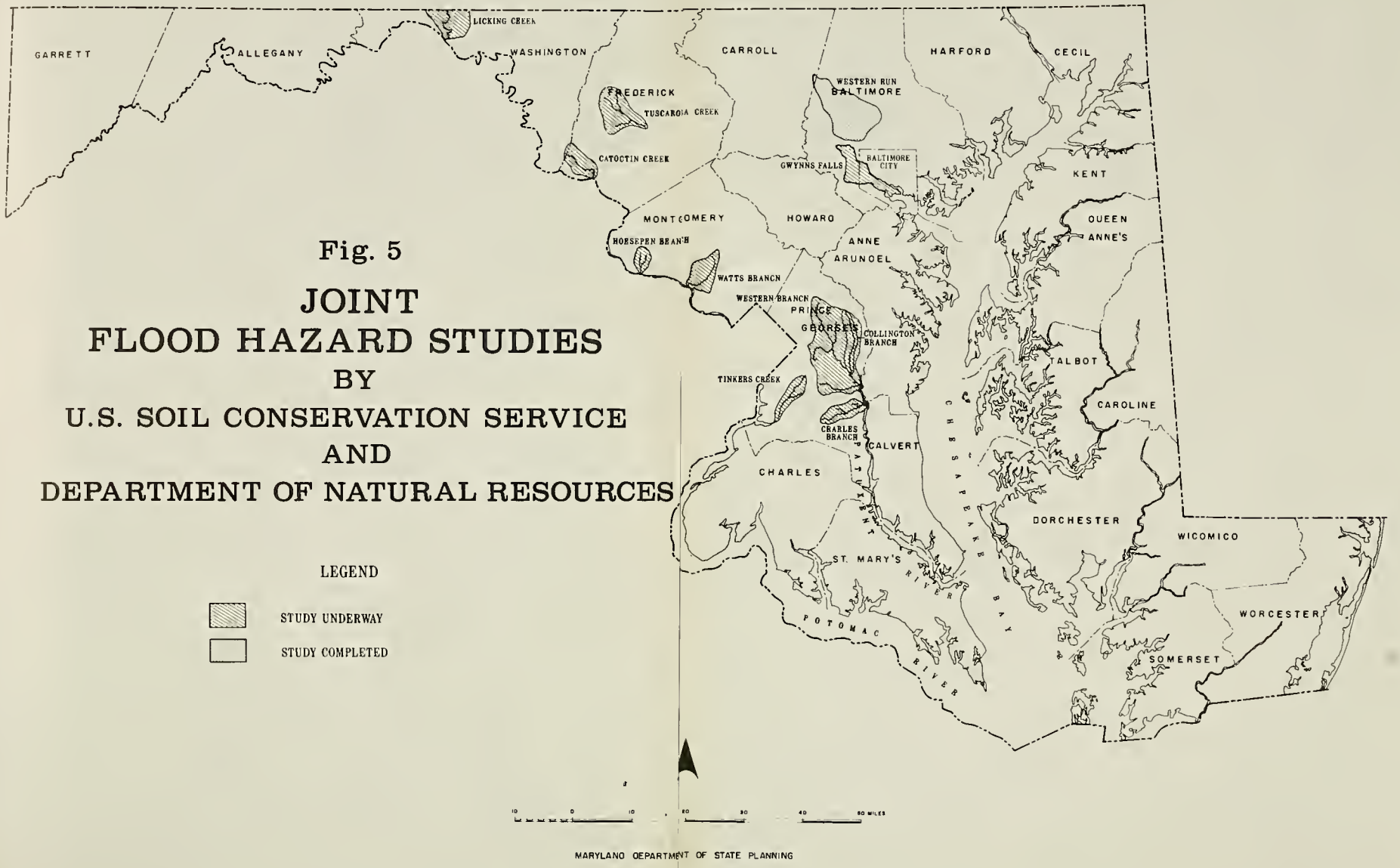
9. DNR uses computers to calculate water surface profiles and route floods through watersheds.

10. SCS prepares final plan and profile sheets indicating flood levels for specified floods.

The above represents a laborious job of collecting field data. However, once this data is collected the effects of alternate land use and resulting runoff can be used to assess the effectiveness of various flood water retarding structures and closely approximate the areas that may be inundated by flooding. The locations of these flood hazard studies are shown in figures 5 and 6 on the next two pages. Joint flood hazard studies undertaken by the U.S. Soil Conservation Service and the Department of Natural Resources are shown in figure 5. Flood hazard studies undertaken by the Department of Natural Resources and local jurisdictions are shown in figure 6. In figure 6, the studies of the Northwest and Northeast Branches of the Anacostia River were joint efforts of the Department of Natural Resources and the Maryland National Capital Park and Planning Commission.

Fig. 5

JOINT FLOOD HAZARD STUDIES BY U.S. SOIL CONSERVATION SERVICE AND DEPARTMENT OF NATURAL RESOURCES



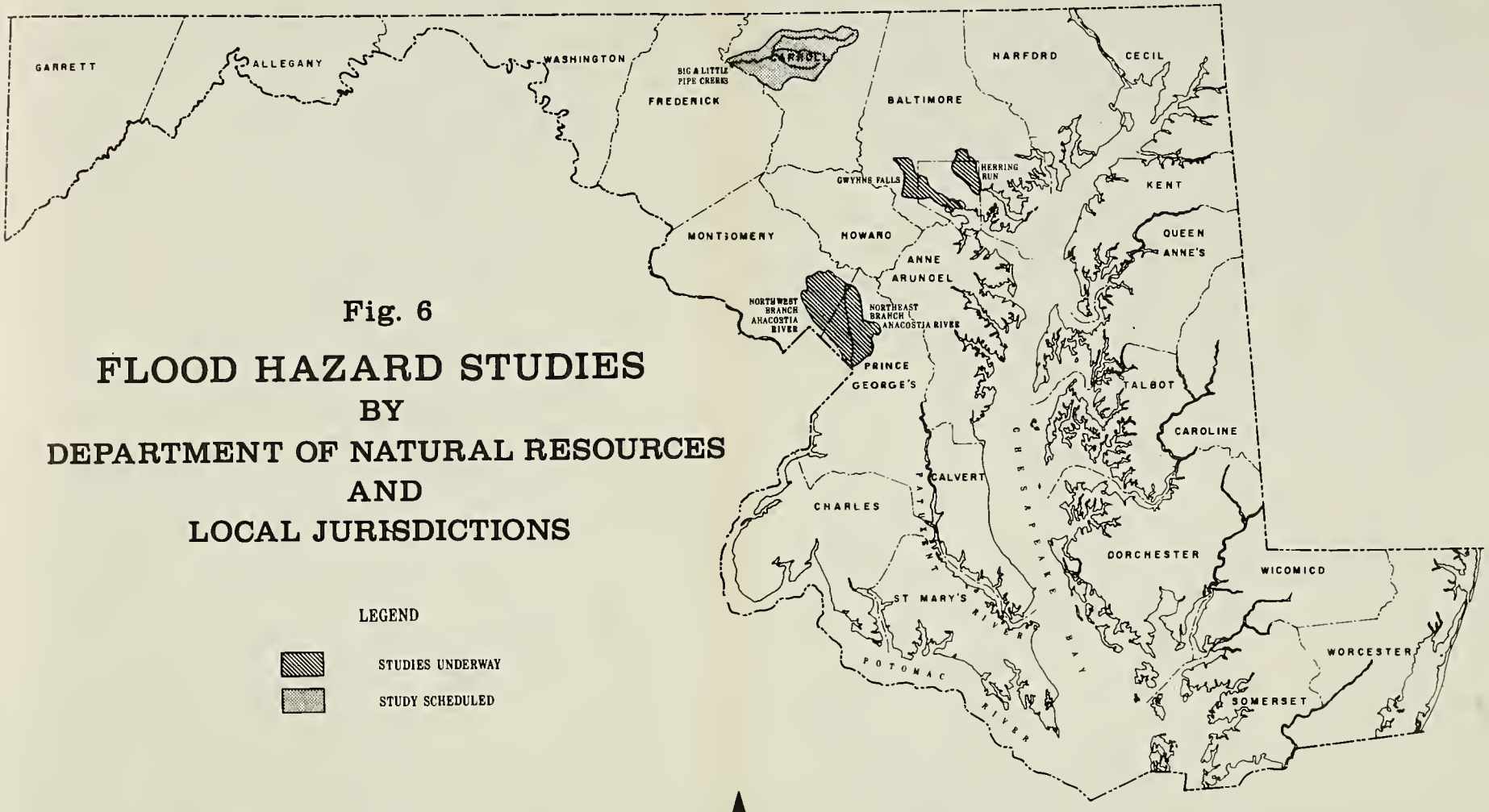


Fig. 6

FLOOD HAZARD STUDIES
BY
DEPARTMENT OF NATURAL RESOURCES
AND
LOCAL JURISDICTIONS

LEGEND

STUDIES UNDERWAY

STUDY SCHEDULED

SCALE 1:500,000

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STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
ALLEGANY COUNTY				
Artemus 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Barton 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Belle Grove 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Cresaptown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Cumberland 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Flintstone 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Frostburg 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Lonaconing 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Oldtown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Patterson Creek 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Paw Paw 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	

USGS - U.S. Geological Survey
SCS - U.S. Soil Conservation Service
N/A - Completion date not available at this time
* - Area of USGS Quad Sheet in more than one Maryland jurisdiction
Maps completed by USGS are available at the Parkville District Office

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
ANNE ARUNDEL COUNTY				
Patuxent River Watershed	Floodplain Delineation For HUD	Corps of Engineers	Underway	8-73
Patapsco River Watershed	Flood Control Study	SCS	Study Requested	N/A
Bowie 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Bristol 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Davidsonville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Laurel 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
*Odenton 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Relay 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
BALTIMORE CITY				
Gwynns Falls Watershed	Flood Hazard Study	DNR & City	Underway	N/A
Jones Falls Watershed	Flood Control Study	Baltimore City	Completed	6-71
Gwynns Falls Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	8-73
Herring Run Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	8-73
Jones Falls Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	8-73

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
BALTIMORE CITY CON'T				
Maiden Choice Run Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	8-73
Moores Run Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	8-73
Patapsco River-Harbor Area Watershed	Flood Insurance Study for HUD	Corps of Engineers	Underway	8-73
Baltimore, East $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	
Baltimore, West $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	
Herring Run Watershed	Flood Hazard Study	DNR & City	Underway	N/A
BALTIMORE COUNTY				
Herring Run Watershed Back River	Floodplain & Storm Drainage Study	DNR	Underway	1973
Patapsco River Watershed	Flood Control Study	SCS	Study Requested	N/A
Western Run Watershed	Flood Control Study	SCS	Feasibility Study Underway	1974
Gwynns Falls Watershed	Flood Hazard Study	SCS & DNR	Underway	1974
Western Run Watershed	Flood Hazard Study	SCS & DNR	Underway	1973
Cockeysville $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
BALTIMORE COUNTY CON'T				
Curtis Bay 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Ellicott City 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
Hampstead 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Hereford 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
Jarrettsville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Lineboro 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Middle River 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
New Freedom 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Norrisville 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Phoenix 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Reisterstown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
*Relay 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Sparrows Point 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Towson 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*White Marsh 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
CALVERT COUNTY				
Broomes Island 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Cove Point 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Upper Marlboro 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
CARROLL COUNTY				
Big and Little Pipe Creek Watershed	Flood Control Study	SCS	Underway	N/A
Patapsco River Watershed	Flood Control Study	SCS	Study Requested	N/A
Piney Run Watershed	Flood Control Study	SCS	Completed	N/A
Damascus 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Emmitsburg 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Finksburg 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Hampstead 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Libertytown 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Lineboro 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Littlestown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Big & Little Pipe Creek	Flood Hazard Study	DNR & County	Completed	

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
CARROLL COUNTY CON'T				
Manchester 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
New Windsor 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Oakland 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Sykesville 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
*Taneytown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Union Bridge 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Westminster 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Woodbine 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
*Winfield 7½ min. quadrangle	Flood Prone Areas 8	USGS	Underway	12-74
Woodsboro 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
CECIL COUNTY				
Big and Little Elk Creek Watershed	Flood Control Study	SCS	Underway	N/A
Lower Reach, Susquehanna River including Towns of Port Deposit and Perryville	Floodplain Delineation	SRBC	Underway	10-74
*Aberdeen 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	

SRBC - Susquehanna River Basin Commission

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
CECIL COUNTY CON'T				
Bay View 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Cecilton 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Conowingo Dam 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Elkton 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
*Havre de Grace 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Newark, W. 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
Northeast 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Rising Sun 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
CHARLES COUNTY				
Gilbert Run	Flood Control Study	SCS	Completed	1958
Mattawoman Watershed	Flood Control Study	SCS	Feasibility Study Underway	N/A
*Brandywine 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
*Mount Vernon 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Piscataway 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
DORCHESTER COUNTY				
Bloodsworth Island 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Deal Island 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Golden Hill 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Hongo 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Sharpstown 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Taylor's Island 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Wingate 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
FREDERICK COUNTY				
Catoctin Creek Watershed	Floodplain Information Study	Corps of Engineers	Authorized	1976
Monocacy River Watershed	Floodplain Information Study	Corps of Engineers	Completed	
Potomac River Watershed	Floodplain Information Study	Corps of Engineers	Authorized	1975
Tuscarora Creek Watershed	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite
Big and Little Pipe Creek Watershed	Flood Control Study	SCS	Underway	1974

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
FREDERICK COUNTY CON'T				
Little Catoctin Creek Watershed	Flood Hazard Study	SCS & DNR	Underway	1975
Tuscarora Creek Watershed	Flood Hazard Study	SCS & DNR	Feasibility Study Underway	N/A
Blue Ridge Summit 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Buckeystown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
Catoctin Furnace 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Damascus 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
*Emmittsburg 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Frederick 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Harpers Ferry 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Keedysville 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	N/A
*Libertytown 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Middletown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Myersville 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
FREDERICK COUNTY CON'T				
Point of Rocks 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Poolesville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Smithsburg 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Taneytown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Union Bridge 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
*Urbana 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
Walkersville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Winfield 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	
Woodsboro 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
GARRETT COUNTY				
Upper Casselman River Watershed	Flood Control Study	SCS	Underway	N/A
Accident 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Avilton 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Barton 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Little Youghiogheny River	Flood Control Study	SCS	Completed	

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
GARRETT COUNTY CON'T				
Bittinger 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Deer Park 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Friendsville 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Frostburg 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Grantsville 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Kitzmiller 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Lonaconing 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
McHenry 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Oakland 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Sang Run 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Table Rock 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
HARFORD COUNTY				
Little Deer Creek Watershed	Flood Control Study	SCS	Completed	1956
Lower Reach, Susquehanna River including City of Havre de Grace	Floodplain Delineation	SRBC	Underway	10-74

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
HARFORD COUNTY CON'T				
*Aberdeen 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Bel Air 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
*Conowingo Dam 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Delta 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Edgewood 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
Fawn Grove 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Havre de Grace 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Jarrettsville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Norrisville 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Phoenix 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*White Marsh 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
HOWARD COUNTY				
Little and Middle Patuxent River Watershed	Flood Control Study	SCS	Underway	N/A

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
HOWARD COUNTY CON'T				
Patapsco River Watershed	Flood Control Study	SCS	Study Requested	N/A
*Clarksville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Damascus 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
Ellicott City 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	7-73
*Sandy Spring 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Savage 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
*Sykesville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Woodbine 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
KENT COUNTY				
Galena 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	N/A
MONTGOMERY COUNTY				
Horsepen Branch	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite
Little Seneca Creek Watershed	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite
Muddy Branch Watershed	Floodplain Information Study	Corps of Engineers	Completed	1973
Seneca Creek Watershed	Floodplain Information Study	Corps of Engineers	Completed	6-67

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
MONTGOMERY COUNTY CON'T				
Watts Branch Watershed	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite
Seneca Creek Watershed	Flood Control Study	SCS	Feasibility Study Underway	N/A
Upper Rock Creek Watershed	Flood Control Study	SCS	Completed	1962
Watts Branch Watershed	Flood Hazard Study	SCS & DNR	Underway	N/A
*Beltsville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Clarksville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Damascus 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
Falls Church 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Gaithersburg 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Germantown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Kensington 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
*Poolesville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
Rockville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Sandy Spring 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
MONTGOMERY COUNTY CON'T				
Seneca $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	
Sterling $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Urbana $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Washington, West $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	
Horsepen Branch	Flood Hazard Study	SCS & DNR	Feasibility Study Underway	N/A
N.W. Branch, Anacostia River Watershed	Flood Hazard Study	DNR & County	Underway	N/A
PRINCE GEORGE'S COUNTY				
Beaverdam Creek Watershed	Floodplain Information Study	Corps of Engineers	Completed	9-67
Charles Branch Watershed	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite
Collington Branch Watershed	Floodplain Information Study	Corps of Engineers	Proposed	Indefinite
Henson Creek Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	N/A
Henson Creek Watershed	Floodplain Information Study	Corps of Engineers	Completed	3-66

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
PRINCE GEORGE'S COUNTY CON'T				
Indian Creek Watershed (N.E. Branch, Anacostia River)	Flood Insurance Study for HUD	Corps of Engineers	Completed	9-71
Indian Creek Watershed (N.E. Branch, Anacostia River)	Floodplain Information Study	Corps of Engineers	Authorized	6-68
Little Paint Branch Watershed	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite
Mattawoman Creek Watershed	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite
N.E. Branch, Anacostia River Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	9-71
N.E. Branch, Anacostia River Watershed	Floodplain Information Study	Corps of Engineers	Completed	6-68
N.W. Branch, Anacostia River Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	9-71
N.W. Branch, Anacostia River Watershed	Floodplain Information Study	Corps of Engineers	Completed	6-68
Paint Branch Watershed (N.E. Branch, Anacostia River)	Flood Insurance Study for HUD	Corps of Engineers	Completed	9-71
Paint Branch Watershed (N.E. Branch, Anacostia River)	Floodplain Information Study	Corps of Engineers	Completed	6-68
Patuxent River Watershed	Floodplain Delineation for HUD	Corps of Engineers	Underway	8-73
Piscataway Creek Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	N/A

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
PRINCE GEORGE'S COUNTY CON'T				
Piscataway Creek Watershed	Floodplain Information Study	Corps of Engineers	Completed	11-67
Sligo Creek Watershed (N.E. Branch, Anacostia River)	Flood Insurance Study for HUD	Corps of Engineers	Completed	9-71
Sligo Creek Watershed (N.E. Branch, Anacostia River)	Floodplain Information Study	Corps of Engineers	Completed	6-68
Southwest Branch Watershed (Western Branch, Patuxent River)	Flood Insurance Study for HUD	Corps of Engineers	Authorized	9-71
Southwest Branch Watershed (Western Branch, Patuxent River)	Floodplain Information Study	Corps of Engineers	Completed	9-68
Tinkers Creek Watershed	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite
Western Branch, Patuxent River Watershed	Flood Insurance Study for HUD	Corps of Engineers	Completed	9-71
Western Branch, Patuxent River Watershed	Floodplain Information Study	Corps of Engineers	Completed	12-72
N.W. & N.E. Branch, Anacostia River Watershed	Flood Hazard Study	DNR & County	Underway	N/A

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	DATE
PRINCE GEORGE'S COUNTY CON'T				
Collington Branch, Western Branch River Watershed	Flood Insurance Study for HUD	SCS	Completed	6-71
Indian Creek, Anacostia River Watershed	Flood Insurance Study for HUD	SCS	Completed	N/A
Little Paint Branch, Anacostia River Watershed	Flood Insurance Study for HUD	SCS	Completed	6-71
Mattawoman Creek (including Charles County) Watershed	Flood Control Study	SCS	Feasibility Study Underway	N/A
Piscataway Creek Watershed	Flood Control Study	SCS	Underway	N/A
Tinkers Creek and Pea Hill Branch Watershed	Flood Insurance Study for HUD	SCS	Completed	6-71
Charles Branch Watershed	Flood Hazard Study	SCS & DNR	Feasibility Study Underway	N/A
Collington Branch Watershed	Flood Hazard Study	SCS & DNR	Feasibility Study Underway	N/A
Tinkers Creek Watershed	Flood Hazard Study	SCS & DNR	Feasibility Study Underway	N/A
Western Branch Watershed	Flood Hazard Study	SCS & DNR	Feasibility Study Underway	N/A
Alexandria $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	
Anacostia $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
*Beltsville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	N/A
Bowie 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Brandywine 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Davidsonville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Lanham 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Laurel 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Mount Vernon 7½ min. quadrangle	Flood Prone Areas	USGS	Being Printed	9-73
*Odenton 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Piscataway 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Upper Marlboro 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Washington, East 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
ST. MARY'S COUNTY				
Gilbert Swamp Run Watershed	Flood Control Study	SCS	Work Plan Completed	1969
St. Mary's River Watershed	Flood Control Study	SCS	Work Plan Completed	N/A

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
ST. MARY'S COUNTY CON'T				
*Broomes Island 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Leonardtown 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
SOMERSET COUNTY				
Crisfield 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Deal Island 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Pocomoke City 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
TALBOT COUNTY				
Tilghman 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
WASHINGTON COUNTY				
Antietam Creek Watershed	Floodplain Information Study	Corps of Engineers	Completed	N/A
Conococheague Creek Watershed	Floodplain Information Study	Corps of Engineers	Underway	1974
Licking Creek Watershed	Floodplain Information Study	Corps of Engineers	Authorized	Indefinite

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
WASHINGTON COUNTY CON'T				
Potomac River Watershed	Floodplain Information Study	Corps of Engineers	Authorized	1974
Little Antietam Creek Watershed	Flood Control Study	SCS	Underway	N/A
Licking Creek Watershed	Flood Hazard Study	SCS & DNR	Feasibility Study Underway	N/A
*Bellegrove $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
Blue Ridge Summit $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Cherry Run $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	
Clear Spring $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Funkstown $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Hagerstown $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
Hancock $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Harpers Ferry $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	
Hedgeville $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
*Keedysville $7\frac{1}{2}$ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73

STUDY AREA	TYPE OF STUDY	AGENCY	STATUS	COMPLETION DATE
WASHINGTON COUNTY CON'T				
Mason-Dixon 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	9-73
*Middletown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
*Myersville 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
Shepherdstown 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	7-73
*Smithsburg 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Williamsport 7½ min. quadrangle	Flood Prone Areas	USGS	Completed	
WICOMICO COUNTY				
Sharptown 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
WORCESTER COUNTY				
Ocean City Watershed (incorporated areas)	Flood Insurance Study for HUD	Corps of Engineers	Completed	6-71
Unincorporated Special Area Study	Flood Insurance Study for HUD	SCS	Completed	9-71
Ocean City 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
*Pocomoke City 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74
Snow Hill 7½ min. quadrangle	Flood Prone Areas	USGS	Underway	12-74

Appendix A

§ 1909.22 Prerequisites for the sale of flood insurance.

(a) In order to qualify for Federal flood insurance a community must apply for eligibility for the entire area within its jurisdiction, and must submit—

(1) Copies of official legislative and executive actions indicating a local need for flood insurance and an explicit desire to participate in the Federal Flood Insurance Program;

(2) Citations to State and local statutes and ordinances authorizing actions regulating land use and copies of the local laws and regulations cited;

(3) A summary of State and local public and private flood plain or mudslide area management measures, if any, that have been adopted for the flood plain areas and/or mudslide areas in the community. This submission may be in any suitable form, but should list or enclose copies of easements, zoning, building, and subdivision regulations, health codes, and other corrective and preventive measures instituted to reduce or prevent flood or mudslide damage;

(4) A large-scale map of the entire area under the community's jurisdiction, identifying local flood plain areas and mudslide areas, if any, and showing the names of rivers, bays, gulfs, lakes, and similar bodies of water that cause floods;

(5) A brief summary of the community's history of flooding and/or mudslides and the characteristics of its flood plain and/or mudslide areas, if available, including the locations of any known high water marks and/or mudslide occurrences. A current flood plain information report prepared by the U.S. Army Corps of Engineers or a similar report will satisfy the requirements of this subparagraph and the preceding subparagraph with respect to flood plain areas;

(6) A clean map of the community, preferably in black and white, clearly delineating its corporate limits, which can be reproduced for publication. If the best available map is copyrighted, a letter of release must be obtained;

(7) A list of the incorporated communities within the applicant's boundaries (if the application is made on behalf of a county or a political subdivision containing more than one incorporated community);

(8) Estimates relating to flood-prone area concerning:

(i) Population,

(ii) Number of one to four family residences,

(iii) Number of small businesses;

(9) Address of a local repository, such as a municipal building, where the flood insurance and flood hazard maps will be made available for public inspection;

(10) If applying before December 31, 1971, a commitment to adopt by that date and maintain in force for areas having special flood and/or mudslide hazards adequate land use and control measures with effective enforcement provisions consistent with the criteria set forth in Part 1910 of this subchapter;

(11) If applying after December 31, 1971, a copy of the land use and control measures the community has adopted in order to meet the requirements of §1910.3 and/or § 1910.4 of this subchapter;

(12) A commitment to recognize and duly evaluate flood and/or mudslide hazards in all official actions relative to land use in the areas having special flood and/or mudslide hazards and to take such other official action as may be reasonably necessary to carry out the objectives of the program; and

(13) A commitment to:

(i) Delineate or assist the Administrator, at his request, in delineating the limits of the areas having special flood and/or mudslide hazards on available local maps of sufficient scale to identify the location of building sites;

(ii) Provide such information as the Administrator may request concerning present uses and occupancy of the flood plain and/or mudslide area;

(iii) Maintain for public inspection and furnish upon request, with respect to each area having special flood hazards, information on elevations (in relation to mean sea level) of the lowest floors of all new or substantially improved structures and, where there is a basement, the distance between the first floor and the bottom of the lowest opening where water flowing on the ground will enter; and

(iv) Cooperate with Federal, State, and local agencies and private firms which undertake to study, survey, map, and identify flood plain or mudslide areas, and cooperate with neighboring communities with respect to management of adjoining flood plain and/or mudslide areas in order to prevent aggravation of existing hazards;

(b) An applicant must also legislatively—

(1) Appoint or designate an agency or official with the responsibility, au-

thority, and means to implement the commitments made in paragraph (a) of this section; and

(2) Designate an official responsible to submit, on each anniversary date of the community's initial eligibility, an annual report to the Administrator on the progress made during the past year within the community in the development and implementation of flood plain and/or mudslide area management measures.

(c) The documents required by paragraph (a) of this section and evidence of the actions required by paragraph (b) of this section must be submitted to the Federal Insurance Administrator, Department of Housing and Urban Development, 451 Seventh Street SW., Washington, DC 20410.

§ 1909.23 Priorities for the sale of flood insurance under the regular program.

Communities which comply with the requirements of § 1909.22 are placed on a register of areas eligible for ratemaking studies and will be selected from this register for ratemaking studies on the basis of the following considerations—

(a) Location of community and urgency of need for flood insurance;

(b) Population of community and intensity of existing or proposed development of the flood plain and/or the mudslide area;

(c) Availability of information on the community with respect to its flood and/or mudslide characteristics and previous losses;

(d) Recommendations of State officials as to communities within the State which should have priorities in flood insurance availability; and

(e) Extent of State and local progress in flood plain and/or mudslide area management, including actual adoption of land use and control regulations consistent with related ongoing programs in the area.

§ 1909.24 Suspensions of community eligibility.

(a) A community eligible for the sale of flood insurance which fails to provide official notice to the Administrator by December 31, 1971, that it has adopted land use and control measures for its flood-prone and mudslide-prone areas in accordance with the requirements of Subpart A of Part 1910 of this subchapter shall automatically lose its eligibility at midnight on that date. A community which provides such official notice but fails to submit the required land use and control measures to the Administrator by January 15, 1972, for review shall automatically lose its eligibility at midnight on that date. The community's eligibility shall remain terminated until the land use and control measures have been received by the Administrator.

(b) The Administrator shall promptly notify the Association of those communities whose eligibility has been suspended, and the Association shall promptly so notify its servicing companies. Flood insurance shall not be sold or renewed in any suspended community until the Association is subsequently notified by the Administrator of the date of the community's formal reinstatement. Policies sold or renewed within a community during a period of ineligibility shall be deemed void and unenforceable whether or not the parties to the sale or renewal had actual notice of the ineligibility.

(c) Communities eligible for the sale of flood insurance after December 31, 1971, shall not thereafter lose their eligibility because of the inadequacy of the land use and control measures they have adopted except upon 30 days' prior written notice and publication in the FEDERAL REGISTER.

Resolution No. _____

SAMPLE RESOLUTION TO BE USED WHEN APPLYING FOR FLOOD INSURANCE

(Note that Resolution B may also be required)

WHEREAS, certain areas of (COMMUNITY) are subject to periodic flooding (and/or mudslides) from (STREAMS, RIVERS, LAKES, OCEANS, ETC.), causing serious damages to properties within these areas; and

WHEREAS, relief is available in the form of Federally subsidized flood insurance as authorized by the National Flood Insurance Act of 1968; and

WHEREAS, it is the intent of this (BOARD, LEGISLATURE, COUNCIL, ETC.) to require the recognition and evaluation of flood and/or mudslide hazards in all official actions relating to land use in the flood plain (and/or mudslide) areas having special flood (and/or mudslide) hazards; and

WHEREAS, this body has the legal authority to adopt land use and control measures to reduce future flood losses pursuant to (CITE APPROPRIATE SECTION OF STATE LAW AND ANY OTHER RELEVANT AUTHORITY);

NOW, THEREFORE, BE IT RESOLVED, that this (BOARD, LEGISLATURE, COUNCIL, ETC.) hereby:

1. Assures the Federal Insurance Administration that it will enact as necessary, and maintain in force for those areas having flood or mudslide hazards, adequate land use and control measures with effective enforcement provisions consistent with the Criteria set forth in Section 1910 of the National Flood Insurance Program Regulations; and

2. Vests (OFFICIAL, OFFICE OR AGENCY) with the responsibility, authority, and means to:

(a) Delineate or assist the Administrator, at his request, in delineating the limits of the areas having special flood (and/or mudslide) hazards on available local maps of sufficient scale to identify the location of building sites.

(b) Provide such information as the Administrator may request concerning present uses and occupancy of the flood plain (and/or mudslide area).

(c) Cooperate with Federal, State, and local agencies and private firms which undertake to study, survey, map, and identify flood plain or mudslide areas, and cooperate with neighboring communities with respect to management of adjoining flood plain and/or mudslide areas in order to prevent aggravation of existing hazards.

(d) Submit on the anniversary date of the community's initial eligibility an annual report to the Administrator on the progress made during the past year within the community in the development and implementation of flood plain (and/or mudslide area) management measures.

3. Appoints (OFFICIAL, OFFICE OR AGENCY) to maintain for public inspection and to furnish upon request a record of elevations (in relation to mean sea level) of the lowest floor (including basement) of all new or substantially improved structures located in the special flood hazard areas. If the lowest floor is below grade on one or more sides, the elevation of the floor immediately above must also be recorded.

4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the program.

Date Passed _____ Certification _____

Sample Resolution to be used by flood-prone communities with regulations in effect requiring building permits for all construction, but no regulations in effect that recognize flood hazards.

Resolution Number _____

SAMPLE RESOLUTION TO BE USED TO INDICATE THE BUILDING PERMIT SYSTEM WHICH THE COMMUNITY HAS ADOPTED AND THE REVIEW PROCEDURE FOR THE SYSTEM

WHEREAS, the (NAME OF COMMUNITY) has adopted and is enforcing (CITE BUILDING CODE, ZONING ORDINANCE), and

WHEREAS, Section
of the aforesaid prohibits any person, firm or corporation from erecting, constructing, enlarging, altering, repairing, improving, moving or demolishing any building or structure without first obtaining a separate building permit for each building or structure from the (TITLE OF OFFICIAL), and

WHEREAS, the (TITLE OF OFFICIAL, OFFICE OR AGENCY) must examine all plans and specifications for the proposed construction when application is made to him for a building permit.

NOW, THEREFORE, BE IT RESOLVED by the (NAME OF LOCAL LEGISLATIVE BODY) of (NAME OF COMMUNITY) as follows:

1. That the (TITLE OF OFFICIAL, OFFICE OR AGENCY) shall review all building permit applications for new construction or substantial improvements to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a location that has a flood hazard, any proposed new construction or substantial improvement (including prefabricated and mobile homes) must (i) be designed (or modified) and anchored to prevent flotation, collapse, or lateral movement of the structure, (ii) use construction materials and utility equipment that are resistant to flood damage, and (iii) use construction methods and practices that will minimize flood damage; and

2. That the (TITLE OF OFFICIAL, OFFICE OR AGENCY) shall review subdivision proposals and other proposed new developments to assure that (i) all such proposals are consistent with the need to minimize flood damage, (ii) all public utilities and facilities, such as sewer, gas, electrical, and water systems are located, elevated, and constructed to minimize or eliminate flood damage, and (iii) adequate drainage is provided so as to reduce exposure to flood hazards; and

3. That the (TITLE OF OFFICIAL, OFFICE OR AGENCY) shall require new or replacement water supply systems and/or sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters, and require on-site waste disposal systems to be located so as to avoid impairment of them or contamination from them during flooding.

Date Passed _____ Certification _____

Appendix B

The following table sets forth the limits of subsidized coverage and the applicable premium rates taken from Sections 1910.2 and 1910.3, Part 1909, General Provisions of the National Flood Insurance Program.

Limits of Coverage and Subsidized Rates

TYPE OF STRUCTURE	STRUCTURE COVERAGE	STRUCTURE RATES	CONTENTS COVERAGE (per unit)	CONTENTS RATE
Single family residential	$ 35,000	$0.25	$ 10,000	$0.35
All other residential	100,000	0.25	10,000	0.35
All non-residential*	100,000	0.40	100,000	0.75

*Includes hotels and motels with normal occupancy of less than six months.

APPENDIX C

Letters of Application to the U. S. Army Corps of Engineers for Floodplain Information Studies

I. Letter of Application. The application of the local governmental agency should be a letter addressed to the District Engineer, prepared with his assistance if necessary, signed by an authorized officer of the sponsoring local agency, and containing the following and any other relevant information, either in the letter or in an enclosure. Applications for PL. 86-645 studies in Maryland must be submitted to H.M. Sachs, Director of the Water Resources Administration, the Governor's representative for coordinating all such studies in the State. Upon approval of the Water Resources Administration, the application will be forwarded to the District Engineer, Corps of Engineers.

II. Content of Letter.

A. Authority of Local Governmental Agency. The authority, law, charter, or resolution clearly establishing the local agency by the State or subdivision thereof, its interests and jurisdiction in floodplain regulation and planning, and its relation to other local agencies having responsibility therefore, should be cited or attached.

1. Necessity for a Responsible Local Governmental Agency. The existence or possible establishment of responsible local agencies to request or sponsor floodplain information studies is considered of great importance. Such agencies should have authority to cooperate with the Corps of Engineers on this matter and to disseminate and explain the information compiled and provided in floodplain information reports.

B. Desired Objectives of Study.

1. General Objectives

a. To compile in a useful form and disseminate to State and local governmental agencies, information on floods and potential flood hazards, including identification of areas subject to inundation by floods of various magnitudes and frequencies.

b. To encourage optimum use of the Nation's river valleys by providing to State and local governmental agencies a factual basis for:

(1) Reducing future flood damage and hazards through carefully considered and well-planned local regulations and use of floodplains;

(2) Planning such advance protection as may be economically justified for prospective land uses that could not be undertaken without protection; and

(3) Preserving adequate floodway and channel rights-of-way and channel clearances.

c. To provide publicly available information for the guidance of private citizens and interests on use of the floodplains.

d. To reduce future expenditures for Federal projects to protect developments which, in the absence of the program, would have taken place, or for alleviation of

flood problems arising from improper floodplain development.

2. Local Objectives. Specific local objectives prompting the application for a Federal study under Section 206, PL. 86-645.

C. Scope and Limits of Study. The geographic area to be studied should be described, together with the nature of present use and any contemplated community or other plans for floodplain development. The time available before local planning decisions must be made should be stated. The type and extent of local data, mapping, planning, etc., that are available and that will be furnished to supplement the studies by the Corps of Engineers, without cost to the United States, should be described. Any local cooperation in gathering data, mapping, or other services that can be provided should be stated.

D. Assurances of Local Cooperation. The letter of application should give assurances that:

1. The applicant will publicize the information report in the community and area concerned, and make copies available for use or inspection by responsible interested parties and individuals.

2. Zoning and other regulatory, development and planning agencies and public information media, will be provided with the floodplain information for their guidance and appropriate action.

3. Survey markers, monuments, etc., established in any Federal surveys undertaken for Section 206 (PL. 86-645) studies, or in regular surveys in the area concerned, will be preserved and safeguarded.

III. Processing of Applications. Letters of application will be reviewed by the District Engineer; if satisfactory, then will be processed through the Division Engineer to the Chief of Engineers for approval, and for an allotment of funds, when available, to initiate the study.

For additional information, refer to:

Corps of Engineers, U.S. Army, Manual EM 1165-2-111, Change 1.

WATER RESOURCE POLICIES AND AUTHORITIES - Floodplain Information Studies. 21 February 1963.

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